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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/471,659	12/24/1999	LLOYD D. CLARK JR.	59.0021	7775

26751 7590 04/07/2003

SCHLUMBERGER AUSTIN TECHNOLOGY CENTER
ATTN: PEHR B. JANSSON, INTELLECTUAL PROP LAW DEPT.
8311 NORTH FM 620
AUSTIN, TX 78726

EXAMINER

ODOM, CURTIS B

ART UNIT PAPER NUMBER

2634

DATE MAILED: 04/07/2003

13

Please find below and/or attached an Office communication concerning this application or proceeding.

PD

Office Action Summary

Application No.

09/471,659

Applicant(s)

CLARK ET AL

Examiner

Curtis B. Odom

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Amdt A filed on 1/30/03.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 21-26 and 31 is/are allowed.
- 6) ☒ Claim(s) 1-7, 20, 27, 30 and 32 is/are rejected.
- 7) ☒ Claim(s) 8-19, 28 and 29 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 February 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-7, 20, 27, 30 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gardener et al (U.S. Patent No. 5, 365, 229) in view of Gaikwad et al. (U.S. Patent No. 6, 292, 559).

Regarding claim 1, Gardener et al. discloses a telemetry system for transmitting well-logging data from at least one downhole tool to a surface data acquisition system, the at least one downhole tool having a first tool data input/output interface, the telemetry system comprising:

a down hole telemetry cartridge (Fig. 1, block 17) connected to at least one down hole tool (Fig. 1, block 14) via a second tool data input/output interface (Fig. 1, block 16) connected to the first tool data input/output interface, wherein the downhole telemetry receives a bitstream for the at least one downhole tool over the second input/output interface (column 1, lines 64-67) and comprising:

a transmitter (Fig. 1, block 17 and Fig. 2, column 3, lines 10-15) connected to the second tool data input/output interface, and

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an uphole telemetry unit (Fig. 1, block 10) connected to the surface data acquisition system via an acquisition computer interface (Fig. 1, block 29) and comprising:

a receiver (Fig. 1, block 28 and Fig. 3, column 3, lines 16-23) connected to the surface data acquisition system having logic operable to receive the analog signals, to demodulate the received signals into a bit stream and to output the bit stream to the acquisition computer via the acquisition computer interface; and

a wireline cable (Fig. 1, block 11, column 3, lines 24-32) providing an electrical connection between the downhole telemetry cartridge and the uphole telemetry unit, wherein the analog signals are transmitted in an uphole direction on the wireline cable.

Gardener et al. does not disclose the apparatus having logic operable to cause transmission of the bitstream as analog signals on a plurality of carrier frequencies and logic operable to receive the analog signals on the plurality of carrier frequencies.

However, Gaikwad et al. discloses a system for transmitting data on a communications channel (Abstract) in which DMT modulation is used for communication between a transmitter and receiver (column 8, lines 26-33). DMT modulation causes transmission of the bitstream as analog signals on a plurality of carrier frequencies. Gaikwad et al. also states that this transmission method can be used in well-logging telemetry (column 72, lines 8-20).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Gardener et al. with the teachings of Gaikwad et al. because DMT modulation divides the frequency band into discrete subchannels, which allows transmitter to avoid the noisy channels and maximize the bit rate using the best subchannels.

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DMT modulation also reduced crosstalk between channels which allows for transmission at higher bit rates.

Regarding claim 2, which inherits the limitations of claim 1, Gardener et al. further discloses the downhole telemetry cartridge is integrated into one of the at least one downhole tool (Fig. 2, column 2, lines 29-30).

Regarding claim 3, which inherits the limitations of claim 1, Gardener et al. further discloses the downhole telemetry cartridge further comprises a sample clock operating at a sampling rate within the range of 300 kHz to 500 kHz (column 6, lines 16-23 and column 7, lines 21-25), wherein the uphole receiver contains a clock recovery circuit, therefore, the downhole cartridge must contain a clock which operates at the system frequency of 360 kHz, which is between 300 kHz and 500 kHz.

Regarding claim 4, which inherits the limitations of claim 1, Gardener et al. further discloses a cable driver connected to the cable interface (Fig. 2, cable driver) and having power optimization logic to adjust total output power of the analog signal to a power level optimized for the wireline cable (column 3, lines 16-19), wherein amplifying the power to a convenient level adjusts total output power of the analog signal to a power level optimized for the wireline cable.

Regarding claim 5, which inherits the limitations of claim 4, Gardener et al. further discloses a cable driver, (Fig. 2, cable driver) but does not disclose the cable driver operating from a voltage supply range of at least -15 to 15 volts. However, it would have been obvious to one of ordinary skill in the art at the time the invention that using a cable driver of this range is a design choice used to obtain a specific power level in a signal. Therefore, this claim does not constitute patentability.

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Regarding claim 6, which inherits the limitations of claim 4, Gardener et al. further discloses a cable driver, (Fig. 2, cable driver) but does not disclose the cable driver driving the total output power to the maximum input tolerance power level of the receiver. However, it would have been obvious to one skilled in the art at the time the invention was made to include this feature because using the maximum power would allow for the use of the maximum bit rate for transmission in that channel. Therefore, this feature does not constitute patentability.

Regarding claim 7, which inherits the limitations of claim 6, Gardener et al. further discloses the cable driver (Fig. 2, cable driver) operates to drive the total output power without consideration for cross-talk with other signals, wherein there is no mention that the cable driver of Gardener et al. takes cross-talk into account while driving the signal.

Regarding claim 20, which inherits the limitations of claim 1, Gardener et al. further discloses the downhole telemetry cartridge is constructed from components capable of operation at temperatures above 150 degrees Celsius (column 3, lines 51-64).

Regarding claim 27, Gardener et al. discloses a method of operating a well-logging telemetry system having a downhole telemetry cartridge and an uphole telemetry unit connected by a wireline cable, comprising:

transmitting (column 2, lines 64-67) the modulated bit stream of a first propagation mode from the downhole telemetry cartridge to the uphole telemetry unit; and

operating (column 3, lines 16-23) the uphole telemetry unit to demodulate the received bitstream.

Gardener et al. does not disclose modulating the bit stream onto a plurality of carrier frequencies.

However, Gaikwad et al. discloses a system for transmitting data on a communications channel (Abstract) in which DMT modulation is used for communication between a transmitter and receiver (column 8, lines 26-33). DMT modulation modulates a bit stream onto a plurality of carrier frequencies. Gaikwad et al. also states that this modulation method can be used in well-logging telemetry (column 72, lines 8-20).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Gardener et al. with the teachings of Gaikwad et al. because DMT modulation divides the frequency band into discrete subchannels, which allows transmitter to avoid the noisy channels and maximize the bit rate using the best subchannels. DMT modulation also reduced crosstalk between channels which allows for transmission at higher bit rates.

Regarding claims 30 and 32, which inherit the limitations of claims 1 and 27, Gardener discloses using a wireline cable for transmission (column 3, lines 24-50), but Gardener et al. does not disclose using a heptacable wireline cable. However, Gardener et al. discloses that telemetry signal distortion is a function of cable length, type, and manufacturer (column 1, lines 24-27). Therefore, it would have been obvious to one skilled in the art at the time the invention that the use of a certain cable can reduce telemetry signal distortion. Therefore, the use of a heptacable is deemed a design choice and does not constitute patentability.

Allowable Subject Matter

3. Claims 8-19, 28, and 29 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
4. Claims 21-26, and 31 are allowable over prior art because prior art does not disclose a well-logging telemetry system which uses an SNR ratio to determine a signal point constellation and adjusts the power level of carriers to optimize data rate in the system.

Conclusion

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Curtis B. Odom whose telephone number is 703-305-4097. The examiner can normally be reached on Monday- Friday, 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on 703-305-4714. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9314 for regular communications and 703-872-9314 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-3900.

Curtis Odom
April 2, 2003



STEPHEN CHIN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800